

**MAGNETOSPHERIC MULTISCALE MISSION
PREPROPOSAL CONFERENCE:
AO 03-OSS-01 HIGHLIGHTS**

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Amended: January 22, 2003 (see p. 30 & 31)

MMS SCIENCE OBJECTIVES

“The scientific objectives of the MMS mission are to explore and understand the fundamental plasma physics processes of, **primarily, magnetic reconnection**, and secondarily, of particle acceleration and turbulence in the Earth’s magnetosphere.

To accomplish these objectives, this AO solicits Instrument Suite Science Team (ISST) proposals **to provide complete scientific research investigations** that must demonstrate how they plan to use the measurements obtained by the instrument suite to address the science objectives.”

- MSS AO, Section 1.2

AVAILABLE NASA RESOURCES

“NASA’s resources available for this program are cost constrained. As a guideline, the total cost to NASA of the ISST investigation selected through this AO from Phase A through Phase E is capped at \$90M in real year dollars, including proposers' cost reserves.”
- MMS AO Section 1.3

“To meet the cost constraint, NASA may descope the ISST investigation either at the time of selection or at any subsequent phase.”
- MMS AO, Section 1.4.1

“NASA has the option to contract in phases for a proposed experiment and to discontinue the investigative effort at the completion of any phase. The investigator should also understand that NASA may desire to select only a portion of the proposed investigation.”
- MMS AO APPENDIX A Section II

OVERVIEW OF SELECTION OF PROPOSALS

SELECTION

Competitive Phase A: "...one (or more) proposal(s) submitted in response to this AO will be selected for a funded Phase A study(ies)."

- MMS AO Section 1.5

DOWNSELECT

Phase B: "The choice of one investigation team to continue into Phase B will be made by the Associate Administrator for Space Science based upon NASA review of the Phase A concept study results and programmatic considerations."

- MMS AO Section 7.3.3

SPACECRAFT SELECTION

will not be made until after the final ISST has been chosen.

- MMS AO Section 5.1.6

INSTRUMENT SUITE SCIENCE TEAM (ISST) INVESTIGATION

AO solicits proposals for an ISST scientific investigation led by a single Principal Investigator (PI) and aided by an appropriate and justified number of Co-Investigators. Proposals must be for complete scientific research investigations including the following elements:

- four suites of flight **instruments capable of producing the necessary and sufficient data to address this mission's science objectives**
- development and implementation of MMS science operations;
- reduction, analysis, distribution, and preparation for archiving of calibrated MMS instrument data;
- analysis and publication of research based on the integrated data sets from MMS that address the MMS science objectives

- MMS AO, Sections 1.2, 1.4.1

ADDITIONAL ELEMENTS

“Additional elements for the MMS mission not listed in Section 1.2 may be proposed in response to this AO only if the proposal demonstrates that such additions are appropriate and justified and do not displace any of the required elements. Although any additional elements so proposed will not be considered in the evaluation for selection through this AO for Phase A, such elements may be included in the Phase A Concept Study Report to be considered in the evaluation for approval for Phase B. Any additional elements included in the proposal must be costed separately.”

- MMS AO Section 1.4.1

Example

Provider of the Mission Operations Center is TBD.

- MMS AO Section 1.4.1

NOT Solicited in this AO INTERDISCIPLINARY SCIENCE INVESTIGATIONS

“NASA (will) separately solicit MMS Interdisciplinary Science (IDS) proposals to conduct independent science investigations addressing the MMS science objectives. Each IDS PI is expected to form a team to conduct investigations addressing the MMS science objectives independently of the ISST science efforts.”

- At the beginning of Phase E, IDS PI's will become members of the MMS SWG
- “The IDS solicitation will be offered approximately six months after the selection of the ISST.”
- “ISST Col's will not be eligible for IDS funding.” - MMS AO Section 1.4.2

DECISION POINTS

Selection: It is anticipated that one or more proposal(s) will be selected for funded Phase A studies. This selection will be guided by categorization based on peer reviews of science merit, technical merit, and feasibility.”

- MMS AO, Section 1.5

Downselect: “The choice of one investigation team to continue into Phase B will be made by the Associate Administrator for Space Science based upon review of the Phase A concept study and programmatic considerations. The criteria for evaluating the concept study are selection criteria + quality of plans for E/PO, advanced technology, and subcontracting to small disadvantaged business activities and minority institutions.”

- MMS AO, Section 7.3.3

Phase A/B transition: The end of Phase A and the transition to Phase B is marked by an Initial Confirmation Review with the Associate Administrator (AA) for Space Science.

- MMS AO, Section 1.4.1

Phase B/C transition: Approval to proceed into implementation requires successful completion of a full Confirmation Review with the OSS AA.

- MMS AO, Section 1.4.1

MMS SCIENCE WORKING GROUP

An MMS Science Working Group (SWG), the purpose of which will be to maximize the scientific return of this mission within the existing resources will be established and be composed of

- the ISST Principal Investigator,**
- up to 4 ISST instrument lead investigators,**
- and the Interdisciplinary Science (IDS) PI's.**

- MMS AO, Section 1.4.3

Phase C/D the IDS PI's will function as members of the MMS Science Working Group (SWG) in an advisory and consultant capacity. At the commencement of the MMS Phase E, each IDS PI will become a member of the MMS SWG

- MMS AO, Section 1.4.2

ANNOUNCEMENT (SCIENCE) OBJECTIVES

“The MMS STDT ...endorsed the understanding of reconnection as it occurs in the Earth’s magnetosphere as the primary science goal for the program. The key questions that must answered in order to achieve this objective are listed in Table 2.1. ...All proposals must address the (Table 2.1 Group 1) questions to be considered compliant with the AO.”

“Table 2.1 Group 1 Questions - Highest Priority

- **What are the kinetic processes responsible for collisionless magnetic reconnection? How is reconnection initiated?**
- **Where does reconnection occur at the magnetopause and in the magnetotail, and what influences when it occurs?**
- **How does reconnection vary with time, and what factors influence its temporal behavior?**
- **How are flux transfer events and plasmoids/magnetotail flux ropes formed, and how do they evolve?”**

- MMS AO Section 2.0

REQUIREMENTS AND CONSTRAINTS

Philosophy

The Phase A concept studies are intended to provide NASA with more definitive information regarding the cost, risk, and feasibility of the investigations, as well as a concept for the conduct of an appropriate education and outreach program, new technology and SDB concept before final selection for implementation. During the Phase A study, a Project Systems Engineering team will act as a resource to the selected investigations for S/C interface and trade study purposes.

- MMS AO Section 7.3.2

“The payload description (in the AO) is considered to be for a strawman payload; **proposals may reflect changes to achieve their proposed science goals.**”

Thus the S/C description (in the AO) is for a strawman S/C; **proposals may reflect changes to the required S/C interfaces or characteristics** in order to achieve their proposed science goals.

- MMS AO Section 5.1.1

NASA-PROVIDED SPACECRAFT

Payload Resource Estimates

Spacecraft resource estimates that resulted from NASA's accommodation studies (i.e., NASA's best estimate of the necessary resources, not including contingency) are provided, as guidelines, in Table 5.1.

Ranging System

“Since the current RSDO-cataloged S/C do not provide an interspacecraft **ranging system**, a separate capability must be provided. Currently, the European Space Agency is being considered as a provider of the interspacecraft ranging system, but a final determination of who will provide the system will not be made until the requirements are known.”

- MMS AO Section 5.1.2

SCHEDULE

ISST Phase A Selections Announced	June 2003
ISST Phase A Studies Complete	December 2003
Instrument Suite Downselect	May 2004
S/C Selection	July 2004
Initial Confirmation Review (A/B transition)	
ISST Preliminary Design Review	March 2005
S/C Mission Design Review	March 2005
Mission PDR	July 2005
Confirmation Review (B/C transition)	September 2005
ISST Critical Design Review	November 2005
Mission CDR	July 2006
Environmental Testing Complete	May 2008
Launch Ready	July 2008
Next launch opportunity after launch readiness	January 2009

- MMS AO Section 5.1.6

INTERNATIONAL PARTICIPATION

“Participation by non-U.S. individuals and organizations is encouraged on the basis of no exchange of funds. However, since such participation can add to management complexity and, therefore, risk, proposed cooperative arrangements

- **should offer significant benefits**
- **while maintaining clear technical and management interfaces.**

Participation by non-U.S. individuals and/or institutions must be endorsed by their own institutions. **If government support is also required, then a government endorsement is also needed.”**

- MMS AO Section 5.3

All proposals must be in compliance with all U.S. Government laws, regulations, and policies governing the export of hardware and/or technical data.”

POC International Agreements: Kent G. Bress (kbress@hq.nasa.gov)

POC ITAR: John F. Hall (jhall@hq.nasa.gov)

MISCELLANEOUS

MMS Data Policy - After check out and calibration the MMS database and analysis software will be made available to the community. Thereafter, all data shall be made public after no more than a two month data processing period.

- MMS AO Section 5.4

Education and Public Outreach (E/PO) - ISST proposals must include the PI's commitment and approach for an E/PO program. A detailed E/PO plan will be developed by each selected investigation as part of its Phase A concept study.

- MMS AO Section 5.5.1

Advanced Technology - Investigations dependent on new technology will not be penalized for risk provided that a reasonable back-up is presented.

- MMS AO Section 5.5.2

Notice of Intent to Propose - An NOI is strongly encouraged by NASA in order to assist in the planning of the evaluation of proposals. - MMS AO Section 6.6.2

INTERNATIONAL PARTICIPATION

“Proposers for non-NASA OSS and also non-U.S. missions must recognize that all such proposals must be consistent, and in compliance, with all U.S. Government laws, regulations, and policies governing the export of hardware and/or technical data. Further, any such successful proposal will require the appropriate agreement(s) and export license(s).

A discussion on Compliance with U.S. Export Laws and Regulations must be included in an Appendix to the proposal

Also, draft language for the technical content of any International Agreements must be provided as part of that Appendix.”

- MMS AO APPENDIX B Section G.

COMPLIANCE WITH US EXPORT LAWS AND REGULATIONS

“Investigations that include international participation, must

- include a section discussing compliance with U.S. export laws and regulations as applicable
- comply with NASA FAR Supplement clause 1852.225-70 entitled "Export Licenses."

The discussion must describe the proposed international participation, including whether or not this participation may require the proposer to obtain the approval of the Department of State or the Department of Commerce via a technical assistance agreement or an export license, or whether a license exemption/exception may apply. If prior approvals via licenses are necessary, the proposal must discuss whether the license has been applied for or, if not, the projected timing of the application and any implications for the schedule.”

- MMS AO APPENDIX B.H.7

SELECTION CRITERIA, FACTORS, AND PROCEDURES

Categorization criteria (all having approximately equal weight):

- “Science Merit of the proposed investigation, including its focus on the mission science objectives and the quality of the science team
 - Technical Merit of the proposed instrument suite focused on the instruments and suite design, demands on S/C resources, and the ability to provide the data needed to accomplish the proposed investigation
 - Feasibility focused on management of overall effort, qualifications of proposal team personnel and institution(s) to carry through to completion (in particular, the ability to produce at least four flight instrument suites), and cost realism and reasonableness.”
- MMS AO Section 7.2

CHANGES from DRAFT MMS AO

Clarification of role of IDS and SWG (Sections 1.4 and 5.2)

Clarification of nominal payload and S/C description and resources (Section 5.0)

Evaluation Criteria Modified (Section 7.0)

For this proposal evaluation criteria for technical merit includes “demands on S/C resources”

for continuation into phase B, evaluation criteria for feasibility of proposed approach includes “impact to S/C resources”

Clarification/revision of proposal organization and page numbers (Appendix B)

Availability of supporting documents in MMS library (Appendix C)

AO ERRATA

Section 1.3, Third sentence

Replace

"Approximately \$0.75M is reserved for each **fixed-price** contract for the Phase A and **Phase A** Bridge study resulting from selection(s) through the AO."

with

"Approximately \$0.75M is reserved for each **cost reimbursement** contract for Phase A study resulting from selection(s) through the AO."

ERRATA, cont.

Section 1.5 - Replace entire section with

"All proposals submitted in response to this AO will be subjected to a preliminary screening to determine compliance with the constraints, requirements, and guidelines of this AO, including the demonstrated commitment of the proposer to meeting NASA's stated goals for education and public outreach, technology infusion/transfer, and participation of small disadvantaged businesses, women owned small businesses, Historically Black Colleges and Universities, and other Minority Educational Institutions. Proposals not in compliance may be returned to the proposer without further review. Proposal(s) in compliance with this AO after this preliminary screening, will be evaluated on its(their) scientific and technical merit as determined by science peer review as well as its(their) feasibility of implementation as determined by the Technical, Management, and Cost (TMC) panel. Pending the submission of proposals of adequate merit, one (or more) proposal(s) submitted in response to this AO will be selected for a funded Phase A study(ies) as based principally on this evaluation. See Section 7.1 below in this AO for further details."

ERRATA, cont.

Section 5.1.1, First paragraph, Fourth sentence

Replace: "In addition to the suite of instruments for each S/C, it is required that one fully qualified flight spare of each instrument be provided."

with: "In designing this strawman payload it was assumed that one fully qualified flight spare of each instrument would be required."

Section 5.1.1, First paragraph, Last sentence

Replace: "The maximum possible values of spacecraft resources for the MMS payload are based on NASA's accommodation studies and given in Table 5.1 as guidelines."

With: "Values of spacecraft resources (not including contingency) for the MMS payload based on NASA's accommodation studies are given in Table 5.1 as guidelines."

ERRATA, cont.

Section 5.3, Paragraph 4 - Delete in its entirety

“S/C, launch vehicles and launch services, and space operations may also be contributed by international partners and should be included in all calculations and discussions of the total cost of the investigation, which is defined as the sum of the cost to NASA and the cost of the contributions (see section 7.3 and Appendix B, Section G).”

Section 5.4.1

Replace

".... after the initial check out and calibration period (approximately **two** months after launch), the MMS database and requisite basic analysis software will be made available.." with

".... after the initial check out and calibration period (approximately **three** months after launch), the MMS database and requisite basic analysis software will be made available.."

ERRATA, cont.

Section 7.3.1 Replace in its entirety with

"Each contract resulting from this selection for Phase A studies will contain a priced option for a Bridge Phase, as well as an advance agreement to add Phases B/C/D/ and E for follow-on mission phases (B/C/D/E). The advance agreement to add Phases B/C/D/ and E recognizes the authority established in the AO to contract for Phases B/C/D/ and E. If the investigation is approved to continue, terms and conditions for these phases will be negotiated based on the concept study report submitted for Phase A. A supplemental agreement shall be executed and shall represent an equitable adjustment to the estimated cost, deliverable items, and delivery schedules, and other affected terms of the contract for inclusion of Phases B through E. Proposals are to include a priced bridge phase option to be exercised upon investigations selected to proceed into phase B/C/D/E. The bridge phase is intended to cover a three month period of Phase B effort to provide program continuity while the Phase B/C/D and E negotiations are completed and these phases are added to the contract.

ERRATA, cont.

Section 8.0 SCHEDULE

Replace

"Selection of Investigations for Phase A Study (goal) **July**, 2003"
with

"Selection of Investigations for Phase A Study (goal) **June**, 2003"

And

Replace

"Proposal submittal due by 4:30 PM **EDT** March 19,2003"
with

"Proposal submittal due by 4:30 PM **EST** March 19,2003"

ERRATA, cont.

Appendix A Section VI

Replace

"Submission of cost or pricing data, as defined in FAR 15.401, is required **if** the combined Phase A and Bridge Phase costs exceed **\$750,000.**"

with

"Because the Phase A costs exceed \$550,000, submission of cost or pricing data, as defined in FAR 15.401, **is required.**"

ERRATA, cont.

APPENDIX B, Section F, First paragraph, Last sentence, Final phrase

Replace "...Total Investigation Cost (Total NASA Cost plus **foreign** contributions)."

With "...Total Investigation Cost (Total NASA Cost plus **all** contributions)."

APPENDIX B Section G. Second paragraph, first four sentences

Replace" The Cost Plan must have two parts: detailed total cost for Phase A and the Bridge phase, and an estimated cost plan for Phases B, C, D, and E. Contracts for a **fixed price** Phase A concept study **and a Bridge Phase A effort** with an **option** to continue into Phases B/C/D/E will be issued. During the bridge phase, the contract modification for Phase B through E will be negotiated. Proposers must estimate the Total NASA Cost...in the proposal and, if selected through this AO, in much more detail in the Phase A implementation plans."

With "The Cost Plan must have two parts: detailed total cost for Phase A and the Bridge phase, and an estimated cost plan for Phases B, C, D, and E. Contracts for a cost reimbursement Phase A concept study and an option for the Bridge effort with an advance agreement to add Phases B/C/D/ and E will be issued. During the bridge phase, the contract modification for Phase B through E will be negotiated. Proposers must estimate the Total NASA Cost (see Table B-2 below in this Appendix) in the proposal and, if selected through this AO, in much more detail in the Phase A implementation plans."

ERRATA, cont.

Table B-1. Proposal Page Guideline

Replace

"Science Investigation Description" 37(pages)" and
**"Mission Operations Support, Science Operations, and Data Analysis Plan
Concept"** 6 (pages)"

with

"Science Investigation Description" 39 (pages)" and
"Data Collection, Analysis, and Archiving" 4 (pages)"

Table B.2

Add row for "Bridge Phase" after the "Total NASA Cost" row with footnote saying
"Also include within Phase B and within Total NASA Cost."

Add row for "Phase E" after "Phase B/C/D" row

Delete second column labeled "FY 06"

ERRATA, cont.

APPENDIX C

Add ``Orbit Design Requirements for MMS," NASA document number 460-RQMT-0042, C. Petruzzo, March 26, 2001

Amendment of presentation of 1/17/03

Several misstatements were made in the presentation: “Magnetospheric Multiscale Mission Preproposal Conference: AO 03-OSS-01 Highlights” given on January 17, 2003. Corrected information is given below

In the section “Payload Resource Estimates” on p. 12 (NASA-PROVIDED SPACECRAFT) the statement should have been:

Spacecraft resource estimates that resulted from NASA's accommodation studies (i.e., NASA's best estimate of the necessary resources, not including contingency) are provided, as guidelines, in Table 5.1.

Amendment of presentation of 1/17/03, cont.

On p. 22 (ERRATA, cont.) the Errata for
Section 5.1.1, First paragraph, Last sentence

Should be

Replace: "The maximum possible values of spacecraft resources for the MMS payload are based on NASA's accommodation studies and given in Table 5.1 as guidelines."

With: "Values of spacecraft resources (not including contingency) for the MMS payload based on NASA's accommodation studies are given in Table 5.1 as guidelines."

On p. 29 (ERRATA, cont.), the Errata for Appendix C should include
Add "Magnetospheric Multiscale Mission Radiation Requirements"